

11 References

- ADAS and Agra CEAS Consulting (2010) Mid Term Evaluation of the Wales Rural Development Plan 2007-13. Final report to the Welsh Assembly Government, ADAS, Wolverhampton, UK
http://ec.europa.eu/agriculture/rurdev/countries/uk/mte-rep-uk-wales_en.pdf
- AEA (2014). Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2012. NAEI Report Reference ED59802/2012/CD8331/GT. ISBN 9780-9573549-5-1. 111 pp.
<http://naei.defra.gov.uk/reports/>.
- Agra (2005) Socio-economic evaluation of Tir Gofal. Final Report for CCW and the Welsh Assembly Government. January 2005 <http://www.ceasc.com/Images/Content/2143%20final%20report.pdf>
- Amundson, R., Guo, Y. & Gong, P. (2003) Soil diversity and land use in the United States. *Ecosystems*, 6, 470-482.
- Andersen, E., Baldock, D., Bennett, H., Beaufoy, G., Bignal, E., Bouwer, F., Elbersen, B., Eiden, G., Giodeschalk, F., Jones, G., McCracken, D., Nieuwenhuizen, W., Eupen, M.v., Hennekes, S., Zervas, G., 2003. Developing a High Nature Value Farming Area Indicator: Final Report, pp. 75.
- Anthony, S., Jones, I., Naden, P., Newell-Price, P., Jones, D., Taylor, R., Gooday, R., Hughes, G., Zhang, Y., Fawcett, L., Simpson, D., Turner, A., Fawcett, C., Turner, D., Murphy, J., Arnold, A., Blackburn, J., Duerdoth, C., Hawczak, A., Pretty, J., Scarlett, P., Laize, C., Douthwright, T., Lathwood, T., Jones, M., Peers, D., Kingston, H., Chauhan, M., Williams, D., Rollett, A., Roberts, J., Old, G., Roberts, C., Newman, J., Ingram, W., Harman, M., Wetherall, J. and Edwards-Jones, G. (2012) Contribution of the Welsh agri-environment schemes to the maintenance and improvement of soil and water quality, and to the mitigation of climate change. Welsh Government, AgriEnvironment Monitoring and Technical Services Contract Lot 3: Soil, Water and Climate Change (Ecosystems), No. 183/2007/08, Final Report, 477 pp + Appendices.
- Armitage, P. D., Moss, D., Wright, J. F. & Furse, M. T. (1983) The performance of a new biological water quality score system based on macroinvertebrates over a wide range of unpolluted running-water sites. *Water Research*, 17, 333-347.
- Avery, B. W. (1980) Soil classification for England and Wales [higher categories]. Technical Monograph, Soil Survey of England and Wales.
- Baker, D.J., Freeman, S.N., Grice, P.V. & Siriwardena, G.M. (2012) Landscape scale responses of birds to agri-environment management: a test of the English Environmental Stewardship scheme. *Journal of Applied Ecology* 49: 871-882.
- Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. 2013. Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford.
- Beaufoy, G., Baldock, D., Clarke, J., 1994. The Nature of Farming e Low Intensity Farming Systems in Nine European Countries. IEEP, London, pp. 68.

Bhogal, A. Boucard, T. Chambers, B. J. Nicholson, F. A. Parkinson, R. 2008. Road Testing of 'Trigger Values' for Assessing Site Specific Soil Quality. Phase 2 – Other Soil Quality Indicators Science Report – SC050054SR2 EA report.

Biggs, J., Fox, G., Nicolet, P., Walker, D., Whitfield, M. & Williams, P. (1998) A guide to the methods of the national pond survey. Pond Action, Oxford. pp 22.

Biological Monitoring Working Party (1978) Final report: Assessment and presentation of the biological quality of rivers in Great Britain. Unpublished Report. . D.o.E. Water Data Unit pp37.

Burns, F., Easton, MA., Gregory, RD., et al., (2013) *State of Nature: Wales*. In the State of Nature Report, The State of Nature partnership available from www.rspb.org.uk/stateofnature

Cadw (2012) The Welsh Historic Environment: Position Statement, 2010-11. Published by Cadw for the Welsh Government 2012. Available from http://cadw.gov.wales/docs/cadw/publications/The%20Welsh%20Historic%20Environment%20Position%20Statement%202010-11_EN.pdf

Cardoso, A. C., Duchemin, J., Magoarou, P. & Premazzi, G. (2001) Criteria for the identification of freshwaters subject to eutrophication: their use for the implementation of the 'Nitrates' and Urban Waste Water Treatment directives. Luxembourg: Office for Official Publications of the European Communities.

Centre for Ecology & Hydrology (2007) Wales Results from 2007. NERC/Centre for Ecology & Hydrology, Welsh Assembly Government, Countryside Council for Wales, 94pp. (CEH Project Number: C03259).

Céréghino R, Biggs J, Oertli B & Declerck S (2008) The Ecology of European ponds: defining the characteristics of a neglected freshwater habitat *Hydrobiologia* 597: 1-6.

Chadd, R. & Extence, C. (2004) The conservation of freshwater macroinvertebrate populations: a community-based classification scheme. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 14, 597-624.

Church, A., Fish, R., Haines-Young, R., Mourato, S., Tratalos, J., Stapleton, L., Willis, C., Coates, P., Gibbons, S., Leyshon, C., Potschin, M., Ravenscroft, N., Sanchis-Guarner, R., Winter, M., & Kenter, J. (2014) UK National Ecosystem Assessment Follow on. Work Package Report 5: Cultural ecosystem services and indicators. UNEP-WCMC, LWEC, UK Ecotec (2010) Valuing the Welsh Historic Environment. http://cadw.gov.wales/docs/cadw/publications/ValuingWelshHistoricEnvironment_EN.pdf

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K. E., Vala Ragnarsdóttir, K., Roberts, D., De Vogli, R. & Wilkinson, R. (2014) Time to leave GDP behind. *Nature*, 505.

Cranfield University (2015) The Soils Guide. Available: www.landis.org.uk. Cranfield University, UK. Last accessed 23/02/2015

Davy-Bowker, J., Murphy, J. F., Rutt, G. R., Steel, J. E. C. & Furse, M. T. (2005) The development and testing of a macroinvertebrate biotic index for detecting the impact of acidity on streams. *Archiv für Hydrobiologie*, 163, 383-403.

D'Costa, V. M., McGrann, K. M., Hughes, D. W. & Wright, G. D. (2006) Sampling the antibiotic resistome. *Science*, 311, 374-377.

Emmett, B., Reynolds, B., Chamberlain, P., Rowe, E., Spurgeon, D., Brittain, S., Frogbrook, Z., Hughes, S., Lawlor, A., Poskitt, J., Potter, E., Robinson, D., Scott, A., Wood, C. & Woods, C. (2010) Countryside Survey: Soils Report from 2007. pp. 192. Centre for Ecology and Hydrology, Wallingford, Oxon UK.

Emmett, B. et al. 2014. Glastir Monitoring & Evaluation Programme. Report to Welsh Government. Year 1.

European Commission. (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *Official Journal of the European Communities*.

European Commission. (2000) Directive 2000/60/EC of the European Parliament and of the Council 23 October 2000: Establishing a framework for Community action in the field of water policy. *Official Journal of the European Communities*.

Extence, C. A., Balbi, D. M. & Chadd, R. P. (1999) River flow indexing using British benthic macroinvertebrates: a framework for setting hydroecological objectives. *Regulated Rivers- Research & Management*, 15, 543-574.

Extence, C., Chadd, R., England, J., Dunbar, M., Wood, P. & Taylor, E. (2013) The assessment of fine sediment accumulation in rivers using macro-invertebrate community response. *River Research and Applications*, 29, 17-55.

Freshwater Habitats Trust (2015) A guide to monitoring the ecological quality of ponds using PSYM pp16. Available from http://www.freshwaterhabitats.org.uk/wordpress/wp-content/uploads/2013/09/PSYM_MANUAL.pdf

Gregory, R. D., Voříšek, P., Noble, D. G., Van Strien, A., Klvaňová, A., Eaton, M., & Burfield, I. J. (2008). The generation and use of bird population indicators in Europe. *Bird Conservation International*, 18(S1), S223-S244.

Hayhow, D. B., Eaton, M. A., Bladwell, S., Etheridge, B., Ewing, S. R., Ruddock, M., & Stevenson, A. (2013). The status of the Hen Harrier, *Circus cyaneus*, in the UK and Isle of Man in 2010. *Bird Study*, 60: 446-458.

Hill, R. A., and Smith, G. M. (2005). Land cover heterogeneity in Great Britain as identified in Land Cover Map 2000. *International Journal of Remote Sensing*, 26(24), 5467–5473.
doi:10.1080/01431160500259931

House of Commons C 243 (2014) House of Commons Environment, Food and Rural Affairs Committee, Food security, Second Report of Session 2014–15.

Holmes, N. T. H., Newman, J. R., Chadd, S., Rouen, K. J., Sharp, L. & Dawson, F. H. (1999) Mean Trophic Rank: A users' manual. R&D Technical Report No E38. Bristol: Environment Agency.

Ibañez, J. J., De-Albs, S., Bermúdez, F. & García-Álvarez, A. (1995) Pedodiversity: concepts and measures. *Catena*, 24, 215-232.

Ibáñez, J., Zinck, J. & Dazzi, C. (2013) Soil geography and diversity of the European biogeographical regions. *Geoderma*, 192, 142-153.

IUCN (2001) 2001 IUCN Red List Categories and Criteria version 3.1.

<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

Jackson, B., Pagella, T., Sinclair, F., Orellana, B., Henshaw, A., Reynolds, B., McIntyre, N., Wheeler, H. & Eycott, A. (2013) Polyscape: A GIS mapping framework providing efficient and spatially explicit landscape-scale valuation of multiple ecosystem services. *Landscape and Urban Planning*, 112, 74-88.

JNCC (2007) Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: Joint Nature Conservation Committee. [Online] Available at: <<http://www.jncc.gov.uk/article17>> [Accessed 17.01.11].

Juggins, S. & Kelly, M.G. (2013). A WFD compatible approach to assess acidification using diatoms in UK and Irish rivers. Report – SC070034/TR2. Environment Agency, Bristol.

Kelly, M., Juggins, S., Guthrie, R., Pritchard, S., Jamieson, J., Rippey, B., Hirst, H. & Yallop, M. (2008) Assessment of ecological status in UK rivers using diatoms. *Freshwater Biology*, 53, 403-422.

Kelly, M. G. & Whitton, B. A. (1995) Trophic diatom index - a new index for monitoring eutrophication in rivers *Journal of Applied Phycology*, 7, 433-444.

LANDMAP (2015) Accessible from:

<http://www.ccw.gov.uk/landscape--wildlife/protecting-our-landscape/.aspx?lang=en>

Latham, J., Miller, H., Mountford, E.P., Kirby, K.J. & Ioras, F. (2005) Country Report – United Kingdom. COST Action E27 –Protected Forest Areas in Europe – Analysis and Harmonisation

Latham, J., Frank, G., Fahy, O., Kirby, K., Miller, H. & Stiven, R (2005) PROFOR – Reports of Signatory States , pp 399– 413. BFW, Vienna.

Ling, L. L., Schneider, T., Peoples, A. J., Spoering, A. L., Engels, I., Conlon, B. P., Mueller, A., Schäberle, T. F., Hughes, D. E. & Epstein, S. (2015) A new antibiotic kills pathogens without detectable resistance. *Nature*, 517, 455-459.

Lomba et al. (2014) Mapping and monitoring High Nature Value farmlands: Challenges in European landscapes *Journal of Environmental Management* 143:140–150.

MacDonald, A., Morris, A.J., Dodd, S., Johnstone, I., Beresford, A., Angell, R., Haysom, K., Langton, S., Tordoff, G., Brereton, T., Hobson, R., Shellswell, C., Hutchinson, N., Dines, T., Wilberforce, E.M., Parry, R., Matthews, V. (2012) Wales Agri-Environment Monitoring Lot 3: Species Monitoring. Final Report. Welsh Assembly Government Contract 183/2007/08 .Welsh Government.

Margalef, O. R. (1958) Information theory in ecology *General Systematics* 3, 36–71.

Maskell, LC.; Crowe, A; Dunbar, MJ.; Emmett, B; Henrys, P; Keith, AM.; Norton, LR.; Scholefield, P; Clark, DB.; Simpson, IC.; Smart, SM. (2013) Exploring the ecological constraints to multiple ecosystem service delivery and biodiversity. *J Appl. Ecol.* 50:561-571

- Mason, W.L. (2007) Changes in the management of British forests between 1945 and 2000 and possible future trends. *Ibis*, 149, 41–52.
- Medcalf K., Whittick E., Turton, N., Cross, D. 2012. Wales Agri-Environment Monitoring Lot 1: Habitats. Final Report. Welsh Government.
- Meyer, J. L., Strayer, D. L., Wallace, J. B., Eggert, S. L., Helfman, G. S. & Leonard, N. E. (2007) The Contribution of Headwater Streams to Biodiversity in River Networks. *Journal of the American Water Resources Association*, 43, 86-103.
- Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington DC. <http://www.millenniumassessment.org/documents/document.356.aspx.pdf>
- Minasny, B., McBratney, A. B. & Hartemink, A. E. (2010) Global pedodiversity, taxonomic distance, and the World Reference Base. *Geoderma*, 155, 132-139.
- Morton, R. D. & Rowland C. S. Developing and Evaluating an Earth Observation-enabled ecological land cover time series system. *JNCC Report No **
- National Agricultural Emission (2013). NAEI Inventory of Greenhouse Gases (spreadsheet). From Rothamsted Research, North Wyke.
- National Soil Resources Institute (2001), NSRI NATMAPVECTOR: LandIS, Cranfield University, Cranfield, UK.
- Nicolet, P., Weatherby, A., Biggs, J., Williams, P. & Hatton-Ellis, T. (2007) A preliminary assessment of important areas for ponds (IAPs) in Wales. Report produced for CCW. Pond Conservation, Oxford. pp 86.
- Nikitin, E., Skvortsova, E., Kochergin, A., Nikitina, O., Sabodina, E. & Myakokina, O. (2007) Integrated red data book of natural resources. *Eurasian Soil Science*, 40, 335-340.
- Office for National Statistics (2013) Annual Mid-year Population Estimates, 2013 Release. Available from http://www.ons.gov.uk/ons/dcp171778_367167.pdf Accessed February 2015.
- Oppermann, R., Beaufoy, G., Jones, G. (Eds.), 2012. High Nature Value Farming in Europe. 35 European Countries: Experiences and Perspectives. Verlag Regionalkultur, Ubstadt-Weiher, Germany, pp. 455.
- Parkinson, C. (2011) Soil bacterium helps kill cancers. <http://www.bbc.co.uk/news/health-14761417>
- Paracchini, M.L., Petersen, J.-E., Hoogeveen, Y., Bamps, C., Burfield, I., Van Swaay, C., 2008. High Nature Value Farmland in Europe e an Estimate of the Distribution Patterns on the Basis of Land
- Pedroli, B., Van Doorn, A., De Blust, G., Paracchini, M.-L., Wascher, D., Bunce, F., 2007. Europe's Living Landscapes. Essays on Exploring Our Identity in the Countryside. Landscape Europe/KNNV, pp. 432.
- Pielou, E. C. (1966) Species diversity and pattern diversity in study of ecological succession. *Journal of Theoretical Biology*, 10, 370–383.

Pond Action [now Freshwater Habitats Trust] (2002) A guide to monitoring the ecological quality of ponds and canals using PSYM. Oxford Brookes University pp15. Available from http://www.freshwaterhabitats.org.uk/wordpress/wp-content/uploads/2013/09/NPMN_PSYM_MANUAL_July09.pdf

Quine, C., Cahalan, C., Hester, A., Humphrey, J., Kirby, K., Moffat, A. and Valatin, G. (2011) Woodlands. *In: The UK National Ecosystem Assessment Technical Report*. UK National Ecosystem Assessment, UNEP-WCMC, Cambridge.

Read, D.J., Freer-Smith, P.H., Morison, J.I.L., Hanley, N., West, C.C. & Snowdon, P.R. (eds) (2009) Combating climate change—a role for UK forests. The Stationery Office, Edinburgh.

Read, H.J. (2000) Veteran tree management handbook. English Nature, Peterborough.

Riley, S. J., DeGloria, S. D., Elliot, R (1999) A Terrain Ruggedness Index that Quantifies Topographic Heterogeneity. *Intermountain Journal of Sciences*, 5(1-4): 23-27

Reynolds, B., Chamberlain, P. M., Poskitt, J., Woods, C., Scott, W. A., Rowe, E. C., Robinson, D. A., Frogbrook, Z. L., Keith, A. M., Henrys, P. A., Black, H. I. J. & Emmett, B. A. (2013) Countryside Survey: National "Soil Change" 1978-2007 for Topsoils in Great Britain-Acidity, Carbon, and Total Nitrogen Status. *Vadose Zone Journal*, 12.

Reynolds, B., B.A. Emmett, T.R.E. Thompson, P.J. Loveland, S.C. Jarvis P. Haygarth, H.R. Thomas, D-H. Owen, R. Roberts, T. Marsden (2002). Critical Appraisal of State and Pressures and Controls on the Sustainable Use of Soils in Wales. Centre for Ecology and Hydrology report, CEH Project C01920, Environment Agency/ National Assembly for Wales Contract 11406. (http://www.ceh.ac.uk/sections/bef/wales_soil_scoping_study.html) Feb 25 2015

Richardson, J. S. & Danehy, R. J. (2007) A synthesis of the ecology of headwater streams and their riparian zones in temperate forests. *Forest Science*, 53, 131-147.

Roberts, M. (2015) Drugs in dirt: Scientists appeal for help. <http://www.bbc.co.uk/news/health-30877343>

Robinson, D. (2015) Moving toward data on soil change. *Science*, 347, 140.

Rodrigues, A. S., Pilgrim, J. D., Lamoreux, J. F., Hoffmann, M. & Brooks, T. M. (2006) The value of the IUCN Red List for conservation. *Trends in Ecology & Evolution*, 21, 71-76.

Rudeforth, C., Hartnup, R., Lea, J., Thompson, T. & Wright, P. (1984) Soils and their use in Wales. *Soil Survey Bulletin*.

Russell, S., Blackstock, T., Christie, M., Clarke, M., Davies, K., Duigan, C., Durance, I., Elliot, R., Evans, H., Falzon, C., Frost, P., Ginley, S., Hockley, N., Hourahane, S., Jones, B., Jones, L., Korn, J., Ogden, P., Pagella, S., Pagella, T., Pawson, B., Reynolds, B., Robinson, D., Sanderson, B., Sherry, J., Skates, J., Small, E., Spence, B., Thomas, C. . (2011) Status and Changes in the UK's Ecosystems and their services to society: Wales. *In: The UK National Ecosystem Assessment Technical Report*. UK National Ecosystem Assessment, UNEP-WCMC, Cambridge.

- Saunders, D. L., Meeuwig, J. J. & Vincent, A. C. J. (2002) Freshwater Protected Areas: Strategies for Conservation. *Conservation Biology*, 16, 30-41.
- Saura, Santiago, and Josep Torné. "Conefor Sensinode 2.2: A Software Package for Quantifying the Importance of Habitat Patches for Landscape Connectivity." *Environmental Modelling & Software* 24, no. 1 (January 2009): 135–39. doi:10.1016/j.envsoft.2008.05.005.
- Seneviratne, S. I., Luthi, D., Litschi, M. & Schar, C. (2006) Land-atmosphere coupling and climate change in Europe. *Nature*, 443, 205-209.
- Smart, S.M.; Allen, D.; Murphy, J.; Carey, P.D.; Emmett, B.A.; Reynolds, B.; Simpson, I.C.; Evans, R.A.; Skates, J.; Scott, W.A.; Maskell, L.C.; Norton, L.R.; Rossall, M.J.; Wood, C. 2009 Countryside Survey:
- Smart, SM, Henrys, P *et. al.* 2012. Clarity or confusion? – problems in attributing large-scale ecological changes to anthropogenic drivers. *Ecological Indicators* 20, 51-56.
- Tebbs, E., J. & C.S. Rowland. 2014. A high resolution woody cover product for Great Britain: preliminary results. Proceedings of RSPSoc 2014 Annual Conference, 2 – 5 September 2014, Aberystwyth, UK.
- Tipping, E. (2002) Cation binding by humic substances. Cambridge University Press.
- Tóth, G., Jones, A., & Montanarella, L. (2013). The LUCAS topsoil database and derived information on the regional variability of cropland topsoil properties in the European Union. *Environmental monitoring and assessment*, 185(9), 7409-7425.
- Towers, W., Bradley R.I., Mayr, T., Feeney, I. & Bruneau P.M.C. (2008). Nature conservation value of soils: bringing functionality into practice. Scottish Natural Heritage Commissioned Report No. 228 (Roame No F05AC101).
- Towers, W., Malcolm, A. & Bruneau, P.M.C. (2005). Assessing the nature conservation value of soil and its relation with designated features. Scottish Natural Heritage Commissioned Report No. 111 (ROAME No. F03AC104).
- United-Nations (2013) System of Environmental-Economic Accounting (SEEA). Experimental ecosystem accounting. https://unstats.un.org/unsd/envaccounting/eea_white_cover.pdf.
- United-Nations (2014) System of Environmental-Economic Accounting (SEEA). Central framework. https://unstats.un.org/unsd/envaccounting/White_cover.pdf.
- Vaughan, I. P. & Ormerod, S. J. (2012) Large-scale, long-term trends in British river macroinvertebrates. *Global Change Biology*, 18, 2184-2194.
- VisitBritain (2015) Inbound visitor statistics for Wales. Summarised by the Welsh Government and available from <http://gov.wales/topics/tourism/researchmain/latest-stats/?lang=en> Accessed February 2015.
- Welsh Government (2013) - Historic Environment Strategy for Wales. www.cadw.gov.wales/docs/cadw/publications/Hist_Env_Strat_Wales_John_Griffiths_EN.pdf

Wales Landscape Partnership (2009) An agenda for Wales' Protected Landscapes.

WFD-UKTAG (2006) UK Environmental Standards and Conditions (Phase 1). SR1-2006. SEPA, Stirling UK.

WFD-UKTAG (2012) Acidification environmental standards. FTT017., SEPA, Stirling UK.

WFD-UKTAG (2014) River Assessment Method: Phosphorous. Phosphorous Standards. ISBN: 978-1-906934-54-5. SEPA, Stirling, UK.

Williams, P., Whitfield, M., Biggs, J., Bray, S., Fox, G., Nicolet, P. & Sear, D. (2004) Comparative biodiversity of rivers, streams, ditches and ponds in an agricultural landscape in Southern England. *Biological Conservation*, 115, 329-341.

Wright, J. F., Furse, M. & Armitage, P. (1993) RIVPACS - a technique for evaluating the biological quality of rivers in the UK. *European Water Pollution Control*, 3, 15-25.

World Reference Base (2006) World Reference Base for Soil Resources. World Soil Resources Report No 103. FAO Rome.